UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,099	01/21/2004	Charles Frank	022153.0012US1	7524

34284 7590 07/16/2007

Rutan & Tucker, LLP.
Hani Z. Sayed
611 ANTON BLVD
SUITE 1400
COSTA MESA, CA 92626

EXAMINER	
DILLON, SAMUEL A	

ART UNIT	PAPER NUMBER
2185	

MAIL DATE	DELIVERY MODE
07/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/763,099	FRANK ET AL.	
	Examiner	Art Unit	
	Sam Dillon	2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8 and 10-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 10-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The Examiner acknowledges the applicant's submission of the amendment dated April 20, 2007. Per the amendment, Claim 9 has been cancelled and Claims 1, 2, 5, 6, 8, 10, 11, 16 have been amended.

2. The instant application having Application No. 10/763,099 has a total of 15 claims pending in the application; there are 5 independent claims and 10 dependent claims, all of which are ready for examination by the examiner.

I. RESPONSE TO AMENDMENT(S) / ARGUMENT(S)

a. ARGUMENTS NOT RELATED TO PRIOR ART

3. In response to the amendment, the following objections and rejections as stated in the previous action are **withdrawn**:

a. The objection to the title.

b. The 35 U.S.C. 112 rejections of Claims 2, 9-10 and 16.

b. ARGUMENTS RELATED TO PRIOR ART

4. **Applicant's arguments with respect to 35 U.S.C. 102(e) and 103(a) rejections of Claims 1-8 and 10-16 have been fully considered but they are not persuasive.**

5. Regarding **Claims 1 and 3-11**, the Applicant appears to contend *(section "35 USC 102", paragraph 1)* that Wang does not disclose and the instant application supports and requires that **the array be operable without using a RAID controller**. The Applicant then contends that the present invention discloses a RAID being master-less, and states that this is in effect controller-less *(section "No New Matter")*. The Examiner respectfully disagrees.

The Applicant states that the limitation is supported by the specification *(section "No New Matter")*. The Examiner notes that the concept of controllerless would seem to imply that the RAID array does not require a RAID controller in order to be operable. The Applicant states that this is enabled by the Summary and Abstract. The limitation *"a RAID controller"* is interpreted as any managing or controlling element *(controller)* that is involved with a redundant array of inexpensive/independent disks *(RAID)*. It is noted that the claims are given the broadest reasonable interpretation, and although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The specification does not appear to support the array being operable without using a RAID controller, but instead appears to disclose the array being operable with the use of multiple RAID controllers. Accordingly, the amendment requiring the array be operable without using a RAID controller appears to not be fully supported by the specification and Applicant's disclosure. The Applicant is directed the 35 U.S.C. 112 first paragraph rejection below.

The Applicant is directed to the rejections of the claims below for specific interpretations relevant to said claims. The rejections have been upheld.

6. Regarding **Claims 1 and 3-7**, the Applicant contends *(section "35 USC 102", paragraph 2)* that the listed claims are allowable because the Office admitted that Wang inherently teaches that **each of the storage devices has a controller**. However, the Applicant does not provide any rationale or reasoning as to why this statement of inherency is enough to render the claims allowable, and additionally does not provide any evidence or argument for as to why a controller of some sort would not be inherent in Wang's devices. Applicant's arguments appear to fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims

define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Wang discloses that the RAID controller communicates with the storage devices via packet multicasting, and that the storage devices may be Network Attached storage, which are thin-servers with standard file protocol support *(Wang, column 8 lines 42-54)*. The Examiner equates a thin-server with a controller.

7. Regarding **Claim 8**, the Applicant contends *(section "35 USC 102", paragraph 3)* that Wang does not disclose **responding devices ignoring mooted requests**. More specifically, the Applicant contends that as Wang discloses requesting devices ignoring mooted responses that this precludes responding devices ignoring mooted requests. The Examiner respectfully disagrees, and notes that the claims themselves do not actually require the responding devices ignoring mooted requests. The Examiner interprets *"wherein **the system** supports auto-annihilation of mooted read requests by disregarding such requests"* as requiring the system ignore mooted read requests by disregarding them, and directs the Applicant to both the original rejection in the previous action and the current rejection below. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

8. Regarding all other Claims not specifically traversed above and whose rejections were upheld, the Applicant contends that the listed claims are allowable by virtue of their dependence on other allowable claims. As this dependence is the sole rationale put forth for the allowability of said dependent claims, the Applicant is directed to the Examiner's remarks above. Additionally, any other arguments the Applicant made that were not specifically addressed in this Office Action appeared to directly rely on an argument presented elsewhere in the Applicant's response that was traversed, rendered moot or found persuasive above.

II. OBJECTIONS TO THE APPLICATION

9. Claim 6 is objected to because of the following informalities:

c. Claim 6 recites *"without a RAID **contoller**"* and should be amended to read *"without a RAID **controller**"*.

Appropriate correction is required.

III. REJECTIONS NOT BASED ON PRIOR ART

Claim Rejections - 35 USC ' 112

10. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

11. **Claims 1, 5, 6 and 11** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Said claims have been amended to recite being usable without a RAID controller. The Applicant states that this limitation is supported by the specification.

The limitation *"a RAID controller"* is interpreted as any managing or controlling element *(controller)* that is involved with a redundant array of inexpensive/independent disks *(RAID)*. It is noted that the claims are given the broadest reasonable interpretation, and although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In one interpretation, the detailed description appears to disclose *(paragraph 2 page 6)* a set of devices responsive to multicast packets that autonomously perform with *"elegance and*

simplicity" the complex functions normally accomplished by a single *"brutish, complex and expensive"* RAID controller, which would seem to imply that each device includes it's own individual RAID controller that is required in order for it to be operable.

In another interpretation, the detailed description appears to disclose a computer or host transmitting a packet to a set of network attached storage devices that subsequently function as a RAID array. This would seem to imply then that the computer or host is controlling the RAID, and can be then seen as a RAID controller.

Given either interpretation, the Examiner asserts that the specification does not support the array being usable as a RAID array without the use or inclusion of anything that can be considered a RAID controller *(such as a disk controller or a host computer)*. The Examiner notes the differences between Wang and the instant invention do not appear to be adequately or accurately reflected in the claims. For the purposes of further examination, the Applicant is directed to the Examiner's specific interpretations in each claim as described below.

IV. REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC ' 102 - Wang

12. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

13. **Claims 1, 3-8, 10 and 11** are rejected under 35 U.S.C. 102(e) as being anticipated by Wang et al. *(US Patent 6,834,326)*.

14. As per **Claim 1**, Wang disclose(s) a storage system comprising

a redundant array of multicast storage areas *(column 2 lines 24-26)* operable without using a distinct RAID controller *(the storage devices do not fail if the RAID*

controller is non-operable, as they are intelligent and autonomous, column 1 lines 29-39 and column 2 lines 24-32).

15. As per **Claim 3**, Wang disclose(s) the storage system of Claim 1, wherein

the storage areas of the redundant array share a common multicast address *inherently implied in column 2 lines 38-43, due the multicast packet being received by all of them and multicast packets having a timeout threshold that limits their range).*

16. As per **Claim 4**, Wang disclose(s) the storage system of Claim 1, comprising

a plurality of RAID sets wherein each raid set comprises a plurality of storage areas sharing a common multicast address *(inherently implied in column 2 lines 38-43).*

17. As per **Claim 5**, Wang disclose(s) a network comprising

a first device and a plurality of storage devices wherein the first device stores a unit of data on each of the storage devices via a single multicast packet *(column 2 lines 40-43)* without dependence upon a RAID controller *(the storage devices do not fail if the RAID controller is non-operable, as they are intelligent and autonomous, column 1 lines 29-39 and column 2 lines 24-32).*

18. As per **Claim 6**, Wang disclose(s)

a network of multicast devices which are operable without a RAID controller *(the storage devices do not fail if the RAID controller is non-operable, as they are intelligent and autonomous, column 1 lines 29-39 and column 2 lines 24-32)*, and which disaggregate at least one RAID function across multiple multicast addressable storage areas *(column 2 lines 24-28).*

19. As per **Claim 7**, Wang disclose(s) the network of Claim 6 wherein

the at least one RAID function is also disaggregated across multiple device controllers *(each device inherently has a controller of some sort, column 2 lines 24-28).*

20. As per **Claim 8**, Wang disclose(s) a storage system comprising

a redundant array of at least first and second multicast storage areas *(column 2 lines 24-26)*, wherein the system supports auto-annihilation of mooted read requests *(duplicate copies are ignored, column 6 lines 50-54)* by disregarding such requests *(when a read request on a mirrored system is received and responded to, in effect the responder tells the requestor to disregard the same read request in that the requestor will disregard all other response to the read request, column 6 lines 50-54)*.

21. As per **Claim 10**, Wang disclose(s) the system of Claim 8 wherein

auto-annihilation comprises a device that received a read request disregarding the read request if a response to the read request from another device is detected *(column 6 lines 50-54)*.

22. As per **Claim 11**, Wang disclose(s)

a storage system comprising a dynamic mirror *(column 4 lines 46-47)* usable without a RAID controller *(the storage devices do not fail if the RAID controller is non-operable, as they are intelligent and autonomous, column 1 lines 29-39 and column 2 lines 24-32)*.

Claim Rejections - 35 USC ' 103 – Wang and Kim

23. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

24. **Claim 2** is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. *(US Patent Number 6,834,326)* and in view of Kim et al. *(Internet Multicast Provisioning Issues for Hierarchical Architecture)*.

25. As per **Claim 2**, Wang disclose(s) the storage system of Claim 1, wherein the multicast storage areas are adapted to communicate across a network via packets *(column 3 lines 24-33)*, but does not disclose the further limitations of Claim 2. Kim discloses

communicating across a network via split-ID packets *(Kim, section 2.3)*

comprising both an encapsulating packet and an encapsulated packet *(Kim, section 2.3 paragraphs 1-2)*; and

each split-ID packets also includes an identifier that is split such that a portion of the identifier is obtained from the encapsulated packet while another portion is obtained from a header portion of the encapsulating packet *(section 2.3 paragraphs 1-2)*.

Wang and Kim are analogous art in that they both deal with multicast network protocols. At the time of the invention, it would have been obvious to a person having ordinary skill in the art to use Kim's IP-in-IP encapsulation procedure on Wang's storage network.

The motivation for doing so would have been that it supports security in the IP layer (Kim, section 3 paragraph 2) and that is solves some scalability issues and has easier implementation aspects *(Kim, section 5 paragraph 1)*.

Therefore, it would have been obvious to combine Wang's storage system with Kim's IP-in-UP encapsulation procedure for the benefit of security, scalability and easier implementation, to obtain the invention of Claim 2.

Claim Rejections - 35 USC ' 103 – Wang and Kim

26. **Claims 12-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. *(US patent Number 6,834,326)* and in view of Lin et al. *("RMPT: A Reliable Multicast Transport Protocol")*.

27. As per **Claim 12**, Wang disclose(s) the storage system of Claim 11 wherein the dynamic mirror includes a mirrored storage area *(column 4 lines 46-47)*, but for the purposes of this rejection does not disclose at least one corresponding map of incomplete writes.

Lin discloses a map of incomplete writes *(figure 5, page 1418)*.

Wang and Lin are analogous art in that they both deal with multicast network protocols. At the time of the invention, it would have been obvious to modify Wang's multicast system to utilize Lin's RMTP protocol.

The motivation for doing so would have been that RMTP is a reliable protocol that avoids the acknowledgement implosion and propagation delays in wide area networks *(page 1415, left hand column, paragraph 3)*.

Therefore, it would have been obvious to modify Wang's system to use the RMTP protocol as taught by Lin for the benefit of being reliable, avoiding acknowledgement implosion and delays, to obtain the invention of Claim 12.

28. As per **Claim 13**, Wang and Lin disclose(s) the storage system of Claim 11 wherein the dynamic mirror comprises N storage devices *(Wang, column 4 lines 46-47)* and M maps of incomplete writes where M is at least 1 and at most 2*N *(Lin, figure 5, page 1418)*.

29. As per **Claim 14**, Wang and Lin disclose(s) the storage system of Claim 13 wherein the map comprises a set of entries wherein each entry is either an LBA *(Lin, interpreted as per the specification as being a logical block address,)* or a hash of an LBA of a storage block of a storage area being mirrored.

30. As per **Claim 15**, Wang and Lin disclose(s) the system of Claim 13 comprising at least one process monitoring storage area ACKs *(interpreted as per the specification as being an acknowledgement signal or packet of some sort)* sent in

response to write commands, the process updating any map associated with a particular area whenever a write command applicable to the area is issued *(Lin, page 1418 left-hand column paragraphs 3-4)*,

the process also sending an ACK on behalf of any storage area for which the process did not detect an ACK *(Lin, inherently implied in that if the sender does not receive an ACK it assumes it received an ACK, section 3.3 paragraph 3)*.

31. As per **Claim 16**, Wang and Lin disclose(s) the system of Claim 15 wherein

updating a map comprises setting a flag whenever an ACK is not received *(Lin, section 3.3 paragraph 3 states that the sender assume, in the absence of an ACK there is no problem, and page 1418 left-hand column paragraph 3 states that swin_lb and avail_win are increased)* and clearing a flag whenever an ACK is received *(Lin, when data is sent, send_next is increased, which can be construed as clearing by writing a new value to, page 1418 left-hand column paragraph 3)*.

IX. CLOSING COMMENTS

32. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

a. STATUS OF CLAIMS IN THE APPLICATION

33. The following is a summary of the treatment and status of all claims in the application as recommended by M.P.E.P. ' 707.07(i):

a(1). CLAIMS NO LONGER IN THE APPLICATION

34. Claim 9 was cancelled by the amendment dated April 20, 2007.

a(2). CLAIMS REJECTED IN THE APPLICATION

35. Per the instant office action, Claims 1-8 and 10-16 have received an action on the merits and are subject of a final action.

b. DIRECTION OF FUTURE CORRESPONDENCES

36. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Dillon whose telephone number is 571- 272-8010. The examiner can normally be reached on 9:30-6:00.

37. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on 571-272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

IMPORTANT NOTE

38. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SAD

Sam Dillon
Examiner
Art Unit 2185

SANJIV SHAH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100